VIRGINIA DEPARTMENT OF AGRICULTURE
AND CONSUMER SERVICES

GUIDELINES FOR APPROVING INDUSTRIAL CO-PRODUCTS FOR AGRICULTURAL USE UNDER THE VIRGINIA FERTILIZER AND AGRICULTURAL LIMING MATERIALS LAWS

PURPOSE

The Virginia Fertilizer and Agricultural Liming Materials Laws allow for the use of industrial co-products as a fertilizer, soil amendment, soil conditioner, horticultural growing media or agricultural liming material. These guidelines are used to assist any person requesting approval from VDACS to distribute an industrial co-product in the Commonwealth for agricultural use by outlining data development requirements to be provided to VDACS for more expedient product distribution approval.

REQUIREMENTS OF THE LAWS

Section 3.1-106.11.A 1. Of the Fertilizer Law prohibits distribution of any regulated product if "it contains any deleterious or harmful ingredient, in sufficient amount to render it injurious to beneficial plant life, when applied in accordance with directions for use on the label". Section 3.1-126.11.B. of the Agricultural Liming Materials Law states, "No liming material shall be sold or offered for sale in the Commonwealth which contains toxic materials in quantities injurious to plants or animals."

Section 3.1-106.6.K. of the Fertilizer Law states, "The commissioner or his agent may require verification of any labeling claims for any regulated product." Sections 3.C.3 and 3.C.4 of VR 115-04-10 "Rules and Regulations for the Enforcement of the Virginia Fertilizer Law" state that the Commissioner may require proof of any claims made for any soil conditioner or soil amendment or one of its labeled ingredients. If no claims are made, the Commissioner may require proof of usefulness and value. For evidence of proof, the commissioner may rely on experimental data, evaluations, including evaluations of data submitted or advice from such sources as the Extension Service of VPI & SU.

GUIDELINES FOR APPROVAL

Any person requesting approval of an industrial co-product to be used as a regulated product under the requirements of the Virginia Fertilizer Law or the Virginia Agricultural Liming Materials Law shall, at the request of the Commissioner of the Virginia Department of Agriculture and Consumer Services or his agent, provide to the Commissioner or his agent product data as outlines in the following three steps before the product is distributed in the Commonwealth:

1. A complete chemical, physical, mineralogical analysis (as appropriate) of the product conducted by an independent laboratory recognized and approved by the Commissioner.

2. Greenhouse pot studies of the product utilizing soil and plant materials from the proposed utilization area conducted by or under the direction of an independent research facility recognized and approved by the Commissioner such as a Land Grant University.

3. Outdoor field trials to confirm the actual effectiveness of the product on soil properties, plant growth, and leachate quality. The field trials shall be run for a minimum of one full growing season and shall be conducted by or under the direction of an independent research facility recognized and approved by the Commissioner such as a Land Grant University.

At the conclusion of each step, the person requesting the product approval shall submit the data to the Commissioner for evaluation. The Commissioner may approve or disapprove any product for use during this evaluation step or approve the product to enter the next step of data development. The Commissioner may waive the requirement for any data development step if he believes it is not necessary based on data previously developed for similar products or is in the best interest of agriculture.

The Commissioner may rely on outside sources such as but not limited to, research agronomists, crop and soil scientists, the Extension Service and the Virginia Experiment Station of Virginia Polytechnic Institute and State University for assistance and advice in evaluating data submitted.

MAXIMUM POLLUTANT CONCENTRATIONS FOR BIOSOLIDS TO QUALIFY AS EXCEPTIONAL QUALITY SLUDGE

FROM VIRGINIA DEPARTMENT OF HEALTH
BIOSOLIDS USE REGULATIONS
12VAC5-585-610

These pollutant limits are used for exceptional quality biosolids intended for application to lawns and gardens in residential locations. These limits are also used for industrial co-products intended for land application as a fertilizer, soil amendment, soil conditioner, or liming material.

TABLE 8B – 12VAC5-585-610 – Maximum Pollutant Concentration in Products for Approval for Land Application

POLLUTANT	CONCENTRATION IN MILLIGRAMS PER KILOGRAM (DRY WEIGHT)
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Molybdenum (1)	41
Nickel	420
Selenium	100
Zinc	2800

TABLE 9 – 12VAC5-585-610 – CUMULATIVE POLLUTANT LOADING RATE OVER SITE LIFE

Pollutant	Kg/ha	(lb/A)
Arsenic	41	(36)
Cadmium	39	(34)
Copper	1500	(1340)
Lead	300	(270)
Mercury	17	(16)
Molybdenum (1)	41	(36)
Nickel	420	(375)
Selenium	100	(91)
Zinc	2800	(2500)

(1) Note: This concentration is currently under study by USEPA.

TABLE 4 – 40 CFR part 503.13 – MAXIMUM ANNUAL POLLUTANT LOADING RATES

POLLUTANT	Kg/ha/365 day period
Arsenic	2.00
Cadmium	1.90
Copper	75.00
Lead	15.00
Mercury	.85
Molybdenum (1)	
Nickel	21.00
Selenium	5.00
Zinc	140.00

(1) Note: This concentration is currently under study by USEPA.

TOXIC MATERIAL AND THE VIRGINIA FERTILIZER LAW

A recent news story claims that toxic heavy metals, chemicals and radioactive wastes are being applied as fertilizer in Oklahoma, Oregon and Washington. The article claims the source of the pollutants is industrial waste.

In the 1980's, many states developed goals to reduce the amount of material going into landfills. Organic materials such as sewage sludge, lawn and garden waste, and wood were banned from landfills. These products were soon diverted to direct land application (treated sewage sludge) or composting facilities.

The Virginia Department of Health (VDH) is responsible for the regulation of sewage sludge applied to agricultural fields. VDH approves sewage sludge application on a field by field basis. VDACS and DEQ assist VDH in this approval process.

VDACS recognized in 1991 that many industries were interested in identifying agricultural uses for waste products, other than sewage sludge, that chemically contained plant nutrients. The Virginia Fertilizer Law of 1970 was silent on the use of these materials as a fertilizer. These products include coal ash, paper mill sludge, smoke stack scrubbers, tobacco dust and foundry sand.

The Virginia Fertilizer Law was amended in 1994 to allow these products, called industrial co-products, to be used as a fertilizer or soil amendment if they could be proven useful and safe to use. In 1994, the VDACS Office of Product Regulation in cooperation with environmental scientists at Virginia Tech developed a set of guidelines entitled GUIDELINES FOR APPROVING INDUSTRIAL CO-PRODUCTS FOR AGRICULTURAL USE UNDER THE VIRGINIA FERTILIZER AND AGRICULTURAL LIMING MATERIALS LAWS. These guidelines are used in conjunction with the heavy metal standards in the Virginia Department of Health Biosolids Use Regulations, VR 335-17-208.6 as the cornerstone of assuring that industrial co-products will not be dangerous to the environment if applied according to label directions.

The guidelines direct that an industrial co-product be studied in a three-step process of chemical analysis and biological testing before it is approved for agricultural use in Virginia. As of 1996, only Virginia and Canada had such guidelines to require testing of industrial co-products before agricultural use was approved. Other states are studying the Virginia guidelines for possible use in their states. The Association of American Plant Food Control Officials is using the Virginia guidelines as a basis to develop national model regulations for the agricultural use of industrial co-products.

The news story is basically correct when it says there is no federal law regulating fertilizers. The EPA does have regulations for heavy metal content of biosolids (sewage sludge) applied to the land. However, all other forms of fertilizer regulations are left up to the states. Other states such as North Carolina and

California do require chemical testing of industrial co-products for heavy metals but have not developed guidelines for biological testing.

THE VIRGINIA PROCESS FOR APPROVING INDUSTRIAL CO-PRODUCTS

1. Company submits research plan to VDACS Office of Product and Industry Standards.

2. Independent laboratory completes chemical analysis. Company submits to VDACS.

3. Third party experts conduct greenhouse pot studies. Evaluate data and determine if outdoor field trials are needed. Develop any needed restrictions for application of the material (i.e., limit amount of material applied per acre per year).

4. Conduct outdoor field trials if needed. Collect and analyze data.

5. Third party experts develop conclusions and make recommendations to VDACS.

6. VDACS worked with company to develop label that includes a guaranteed analysis plus any needed cautions, restrictions and directions for use discovered by the research.

7. VDACS in conjunction with company and experts determine extent and frequency of future testing of the product to be submitted to VDACS.

8. VDACS approves registration of the product for distribution in Virginia.

9. VDACS Agricultural Inspectors obtain official random samples of product being distributed. Samples tested by DCLS.

RESTRICTIONS FOR INDUSTRIAL CO-PRODUCTS
RECOMMENDED BY DR. W. LEE DANIELS
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1. Salt content – The electrical conductance (EC) should not exceed 2mmhos/cm in bulk amended soils especially for salt sensitive plants like legumes (soybeans, peanuts, alfalfa) and may damage seed germination.

2. Boron content – Extractable (soluble) boron should not exceed 5 ug/g. Will cause B toxicity (necrotic and spotty leaf blades with burned tips and margins) which will reduce yield B sensitive plants like legumes (soybeans, etc.) and grasses, and may damage seed germination.

3. Selenium – Toxic to grazing animals as low as 4 ppm in forage plant tissues.

4. Molybdenum – Toxic to grazing animal @ 5 ppm in forage plant tissue.

5. Each co-product, especially CCBs, is unique due to differences in processing. Each should be subjected to bioassay at the proposed loading rate in the soil substrate of interest to the applicator.